More than 100 km (60 miles) of GPR data were acquired to define the locations and characteristics of old inlet channels (paleo-inlets) from Oregon Inlet to Ocracoke Inlet (Smith, 2006) (Fig. 8). Based upon these data, sediment cores were collected to provide sediment for determining the age of inlet activity and defining the role of inlet formation in barrier island evolution.

GPR data reveal that paleo-inlet channels constitute 60% to 70% of Hatteras and Pea Islands between Oregon Inlet and Cape Hatteras (Fig. 8). Two main types of paleo-inlet channels (non-migrating and migrating) were classified based on geometry and fill patterns. The paleo-inlet channels are cut into older flood-tide delta deposits that correspond to older inlet activity when barriers existed further seaward. Flood-tide delta deposits are generally overlain by marsh peat and storm overwash sediments. Channel-fill sediments occur under the widest portions of the island, whereas narrow portions of the island are underlain by the FTD and overwash sediments. This relationship is attributed to the successional stage of island evolution in response to rising sea level (Fig. 3), and indicates that the narrow island segments are now in need of new inlets and deposition of new FTD's to increase island width.

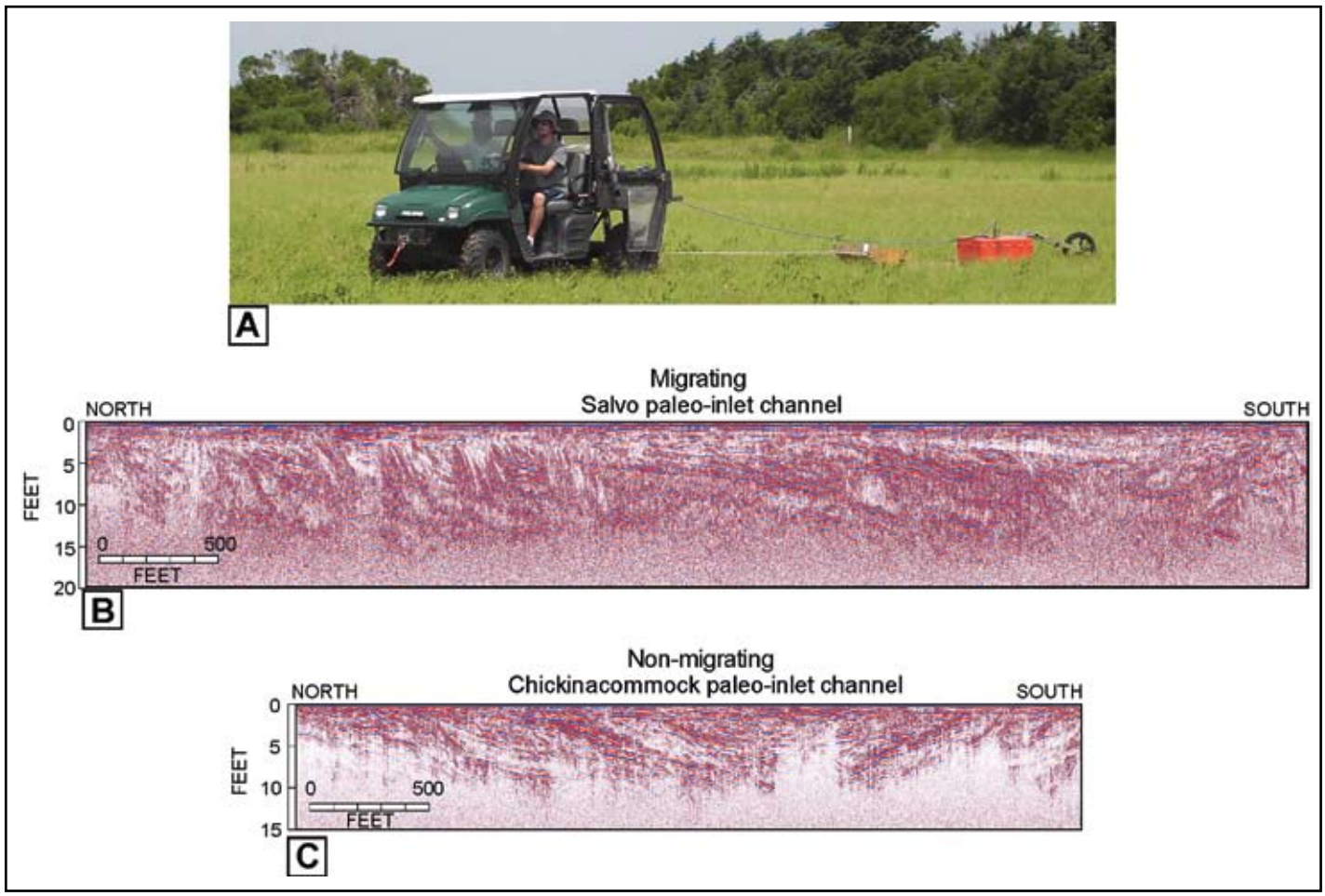

Figure 7. (A) A photograph showing the process of collecting ground penetrating radar data using an all-terrain vehicle. The GPR antenna is the orange box being pulled across the ground surface. (B) GPR data illustrating a migrating inlet channel (from Salvo). (C) GPR data illustrating a non-migrating inlet channel (Chickinacommock Inlet north of Rodanthe). The location of the data are shown on Figure 6.